

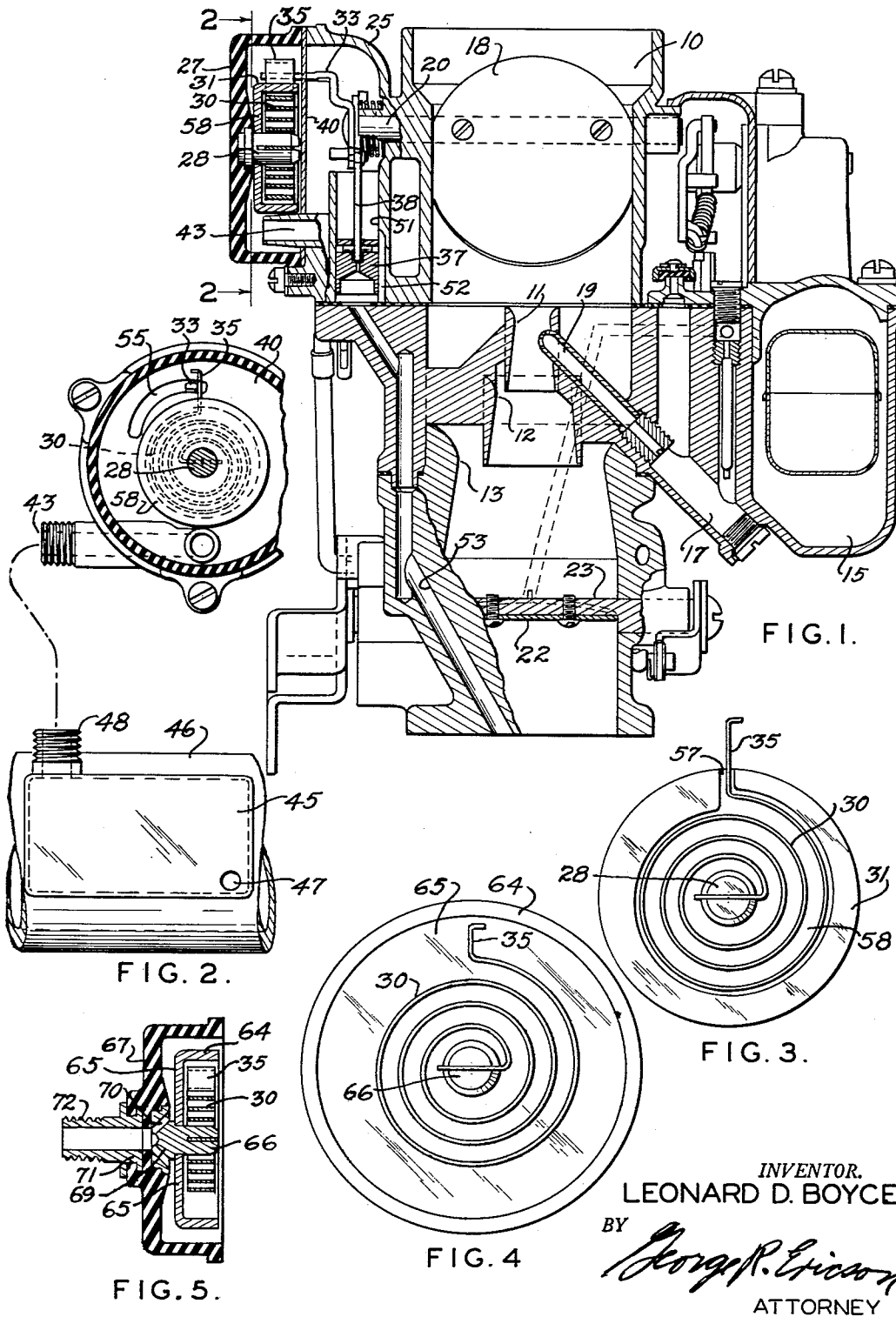
Aug. 16, 1955

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2,715,500

AUTOMATIC CHOKE CONTROL DEVICE

Filed April 19, 1950



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AUTOMATIC CHOKE CONTROL DEVICE

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Application April 19, 1950, Serial No. 156,855

9 Claims. (Cl. 236—101)

This invention relates to automatic choke control devices and consists particularly in means for preventing excessively rapid cooling of the choke control thermostat, and consequent premature closing of the choke valve.

In conventional automatic choke control devices, the thermostat is mounted so that it is surrounded in its housing by free air space. Since such devices are generally mounted on the carburetor at some distance from the exhaust manifold, and since air gives up its heat at a greater rate than metal, when the engine is turned off a thermostat so mounted tends to become cool before the engine, thus closing the choke valve and thereby unduly enriching the fuel mixture in proportion to actual engine temperature. During this period, in the conventional construction, restarting of the engine is temporarily hindered due to the undesired enrichment of the fuel mixture resulting from the premature closing of the choke valve.

It is therefore an object of this invention to provide means whereby restarting of the engine may be facilitated at all times during the interval between cessation of operation and complete cooling off of the engine, by preventing premature closing of the choke valve.

An object of this invention is to provide simple yet effective means for keeping automatic choke thermostats substantially at engine temperature after the engine has been turned off.

Another object is to provide means for accomplishing this result which will be inexpensive to manufacture and at the same time easily installed on conventional automatic choke devices without any modification of their structure.

These objects and other more detailed objects hereafter appearing are attained substantially by the mechanism illustrated in the accompanying drawings, in which:

Fig. 1 is a vertical section through a carburetor incorporating my invention.

Fig. 2 is a section along the line 2—2 of Fig. 1, showing the automatic choke control and its source of heat.

Fig. 3 is an elevation of one form of heat retaining device.

Fig. 4 is an elevation of another form of heat retaining device.

Fig. 5 is a vertical section through a heat retaining device and a novel mounting therefor.

Referring now to the drawings,

Fig. 1 illustrates a downdraft carburetor having a mixing conduit 10 formed with venturis 11, 12, and 13, a float controlled constant level fuel chamber 15, and metering orifice (not shown), passageway 17, and main nozzle 19 for transmitting fuel from fuel chamber 15 to mixing conduit 10.

An unbalanced disk type choke valve 18 mounted on rotatable shaft 20 controls the admission of air to mixture conduit 10. A throttle valve 22, mounted on shaft 23 controls the outlet of mixture conduit 10.

For controlling choke valve 18, an automatic choke control device is mounted on the carburetor adjacent an end of shaft 20. The choke control device comprises housing 25, a cup-shaped removable cover 27 for said

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housing, cover 27 being molded of synthetic resin or other material of low heat conductivity and having a central inwardly extending slotted post 28 for receiving bimetallic thermostatic coil 30 and heat retaining casing 31, a crank 33 yieldably mounted on choke shaft 20 with its free end abutting against the outer hooked end 35 of thermostat coil 30, so that when thermostat 30 is cold it normally urges choke valve 18 to its closed position, suction responsive piston 37 with its piston rod 38 operatively connected to choke valve shaft 20 for assisting in opening choke valve 18 against the closing force of thermostat 30, and a thin partition 40 interposed between cover 27 and housing 25. It should be noted that casing or cup 31 is formed with relatively thick metal walls to provide a heat storing mass in the vicinity of the thermostat.

Heated air is supplied to air inlet 43 of the thermostat chamber from a stove 45 situated on the exhaust manifold 46 and formed with air inlet 47 and outlet 48, the latter communicating with inlet 43 via suitable passageways (not shown).

Piston 37 is slidably mounted for vertical movement in cylinder 51, which is formed with a vertical groove 52 in its wall. Manifold vacuum is communicated to cylinder 51 through passage 53, so that the vacuum in passage 53 draws heated air from manifold stove 45, through inlet 43 past heat retaining cup 31, through arcuate slot 55 in partition 40, past piston 37 via groove 52, and into the intake manifold (not shown) through passage 53.

As the heated air passes cup 31, cup 31 becomes heated and causes thermostat 30 to become heated, so that, due to the different rates of expansion of the two metals of strip 30, its outer end 35 moves in a counter-clockwise direction, thus permitting clockwise or opening movement of crank 33, shaft 20, and valve 18.

When the engine is stopped, heated air is no longer drawn past thermostat 30, and unless means such as heat retainer 31 are provided to retain heat adjacent thermostat 30, it tends to become cool much more rapidly than the engine, thereby closing choke valve 18, since the air surrounding the thermostat normally gives up its heat much more rapidly than the metallic mass of the engine. To prevent this occurrence heat retaining cup 31 is provided, and, as shown in Fig. 3, is in the form of a cup having a thick metal peripheral wall; the inner surface of which is in the shape of the outline of a helix to accommodate thermostat 30; a slot 57 is formed in the peripheral wall to accommodate the outer end 35 of thermostat 30; cup wall 58 is formed with a central opening for rotatable mounting on post 28, to permit rotation along with outer end 35 of thermostat 30. It will be noted that the cup in effect divides the automatic choke chamber into a pair of semi-chambers, one semi-chamber containing the hot air inlet and the other enclosing the thermostat.

When the engine is stopped, sufficient heat is stored in the metallic mass of cup 31, which, being in close proximity to thermostat 30, prevents too rapid cooling thereof, and consequent closing of the choke valve before the engine has become sufficiently cool.

Fig. 4 illustrates another form of heat retaining cup having a peripheral wall 64 of sufficient diameter to completely surround thermostat 30 and its outer hooked end 35, and an end wall 65 formed with a central mounting hole. Referring now to Fig. 5, the cup of Fig. 4 is shown mounted on central post 66 of modified housing cover 67; due to the enlarged diameter of the cup, the annulus between the outer surface of its peripheral wall 64 and the inner wall of cover 67 is very narrow. Central post 66 is formed with a slot at one end for mounting thermostat 30 and its other end is enlarged as at 69, and is

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formed with branched passageway 70. Cover 67 of material of low heat conductivity is molded around enlarged end 69 of post 66 and around a similar enlarged end portion 71 of inlet nipple 72, with a relatively thin wall separating nipple 72 from post 66, so as to insulate post 66 from the relatively rapid cooling effect of the outside air on nipple 72. In operation heated air is drawn from manifold stove 45 through nipple 72 and branched passageways 70, from which it is directed against end wall 65 of the cup, and is drawn off via the narrow annulus surrounding the cup. By utilizing the shallow space between the cup and the cover as a heat passageway, the full effect of the heated air is directed against the walls of the cup, thereby causing more rapid heating of the cup.

This invention may be modified as will occur to those skilled in the art and the exclusive use of all modifications as come within the scope of the appended claims is contemplated.

I claim:

1. In an automatic choke control device having a thermostat for regulating the opening of the choke valve, an outer heat resistant cover forming a thermally insulated chamber for said thermostat, and an inner heat retaining cup surrounding said thermostat, said heat retaining cup conforming substantially to the shape of the thermostat so as to permit substantial contact therewith, said cover and said cup being in spaced relation to each other, and an inlet for admitting heated air into said chamber externally of said cup.

2. In an automatic choke control device having a thermostat for regulating the opening of the choke valve, a heat resistant outer cover for said device, said cover being formed with a central inwardly extending slotted post for mounting said thermostat and a central outwardly extending nipple for receiving heated air, a plurality of passageways in the base of said slotted post communicating at one end with said nipple and at their other end with the interior of said cup, a heat resistant wall separating said nipple and said post, and a heat retaining cup mounted on said post and enclosing said thermostat, said cup and said cover being in spaced relation with each other.

3. In an automatic choke control device having a thermostat for regulating the opening of the choke valve, wall structure forming a thermally insulated chamber, an inlet for admitting heated air to said chamber, and a metallic mass interposed between said air inlet and said thermostat and forming with said wall structure a pair of semi-chambers, said air inlet discharging directly into the first of said semi-chambers and said thermostat being in said second semi-chamber, said mass being in spaced relation with said wall structure and in heat exchange relation with said thermostat whereby heat stored in said mass during the flow of air through said chamber may be transferred to said thermostat after cessation of air flow.

4. In an automatic choke control device having a thermostat for regulating the opening of the choke valve, an insulating outer cover for said device, a central outwardly extending nipple for receiving heated air, a passageway communicating at one end with said nipple and at the other end with the interior of said cover, a metallic mass mounted in said cover adjacent said thermostat and forming with said outer cover a pair of semi-chambers, said passageway discharging into said first semi-chamber and said thermostat being in said second semi-chamber, and a central inwardly extending post for mounting said thermostat in heat exchange relationship with said mass.

5. Apparatus for automatically controlling the choke valve of an internal combustion engine including a casing having a main wall portion comprising non-metallic, relatively low heat conducting material, a metallic heat storing member in said casing spaced from said main wall portion and providing a fluid heating medium receiving chamber adjacent one side of said wall, a temperature re-

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sponsive choke valve regulating element carried by said casing and located on the side of said heat storage member opposite from said chamber, means operatively connecting said temperature responsive element with said choke valve, and a conduit communicating with said chamber for supplying fluid heating medium from a heated portion of said engine to said chamber.

6. In a choke control device for a carburetor, a housing, a cover for said housing, a passage through said cover for heated air, a heat storing member of substantial mass secured to the inner side of said cover for absorbing heat from the air supplied through said passage, a shaft connected to said member, a coiled bi-metallic thermostat mounted on said shaft, and means for connecting said element to a choke valve, said heat storing member forming partially segregated spaces within said housing, said passage opening into one of said spaces and said thermostat being located in the other space, there being restricted communication from said passage through said first space and past said heat storing member to said thermostat whereby access of heated air to said thermostat is restricted and heating of said thermostat thereby retarded.

7. In an automatic choke control device having a thermostat for regulating the opening of the choke valve, a heat resistant outer cover for the device, a centrally arranged inwardly extending post carried by the cover for mounting said thermostat, a heat storing mass also in said housing and interposed between said thermostat and said cover, said heat storing mass including a body of generally disc form arranged concentrically about said post, a passageway leading into said housing, and means for supplying a flow of heated fluid to said housing.

8. In a choke control device for a carburetor, a housing, a passage through the wall of the housing for heated fluid, a choke controlling thermostat arranged in said housing and spaced from the wall thereof, a heat storing mass in said housing, said heat storing mass including a disc-like body portion interposed between the thermostat and the housing wall, said heat storing mass and thermostat being in heat exchange relation to the flow of fluid through said passage and to each other, whereby said heated fluid tends to produce relatively rapid heating of the thermostat and said mass serving to extend the heating of the thermostat after the fluid flow is discontinued.

9. In a choke control device for a carburetor, a housing, a passage through the wall of said housing for heated fluid, a choke controlling thermostat in said housing, means for inducing a flow of heated fluid through said passage into said housing, a heat storing mass also in said housing, said heat storing mass including a plate-like body arranged at one side of said thermostat and parallel thereto and in sufficiently close proximity to said thermostat for directly influencing the thermostat by the heat absorbed by the mass after the termination of the flow of heated fluid through said passageway into said housing, both said mass and said thermostat being exposed to be heated by fluid entering said housing through said passage.

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